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EXAMINER	
BAUER, SCOTT ALLEN	

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/748,437	CAVE ET AL.	
	Examiner	Art Unit	
	Scott Bauer	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-8,13-24 and 27* is/are rejected.

7)☒ Claim(s) *2,4,9-12,25,26,28 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 & 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Mitsubishi Electric Corporation (JP S64-039230).

3. With regard to Claim 1, Mitsubishi Electric Company, as described in the English abstract, discloses a current limiting fusible module, for use in a cryogenic fuse, said fusible module being adapted to initiate a current limiting arc, said fusible module comprising: a first cryogenic composite (10); a second cryogenic composite (11), adjacent to said first cryogenic composite; wherein at least one of said first and said second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one

of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc.

4. With regard to Claim 3, Mitsubishi Electric Company, discloses a current limiting fusible module as claimed in Claim 1, further comprising one of said first and second cryogenic composite having the highest resistance (11) and two of the other cryogenic composite (10) disposed on either side thereof.

5. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Otto et al. (US 6762673).

6. With regard to Claim 1, Otto et al., in Figure 1C, discloses a current limiting fusible module (70), for use in a cryogenic fuse, said fusible module being adapted to initiate a current limiting arc (column 1 lines 20-22), said fusible module comprising: a first cryogenic composite (54); a second cryogenic composite (52), adjacent to said first cryogenic composite (54); wherein at least one of said first and said second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current (column 2 lines 30-42), further wherein one of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc (column 4 lines 6-20). Otto et al. discloses that the first cryogenic composite is a silver

alloy (column 6 lines 65-67 & column 7 lines 1&2) and that the second cryogenic composite is a high temperature oxide superconductor (column 7 lines 8-10).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Electric Company (JP S64-039230), in view of Otto et al. (US 6762673).

9. With regard to Claim 5, Mitsubishi Electric Company teaches a fusible element, for use in a cryogenic fuse, said fusible element being adapted to initiate a current limiting arc, said fusible element comprising: a plurality of a first cryogenic composite (10); a second cryogenic composite (11), the second cryogenic composite (11) being adjacent to one of said plurality of said first cryogenic composite (10); wherein at least one of said first and said second cryogenic composites (11) has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc.

Mitsubishi Electric Company does not teach that the protective device comprises a plurality of second cryogenic composites being adjacent to the plurality of the first cryogenic composite.

Otto et al., in Figure 1C, teaches a fusible element (70), for use in a cryogenic fuse, said fusible element being adapted to initiate a current limiting arc, said fusible element comprising: a first cryogenic composite (54); a plurality of a second cryogenic composite (52), each of said plurality of said second cryogenic composite being adjacent to the first cryogenic composite to thereby create a plurality of current limiting fusible modules; wherein at least one of the first and second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one of the first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Mitsubishi Electric Company with Otto et al., by forming the protective device of Mitsubishi on the tape taught by Otto et al., for the purpose of manufacturing a large number cryogenic fuses and treating them all at once on a single reel (Otto et al. column 5 lines 25-54).

Further, Mitsubishi Electric Company discloses the claimed invention of Claim 5 except that the fusible element does not comprise a plurality of first and second cryogenic composite, place adjacent to one another thereby creating a plurality of current limiting fusible modules. However, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to create a plurality of fusible modules, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

10. With regard to Claim 6, Mitsubishi Electric Company in view of Otto et al. discloses the fusible element of Claim 5. Otto et al., in Figure 1C, further discloses that the pluralities of the first (54) and pluralities of (52) second cryogenic composites form a series having two ends, wherein the one of said first and second cryogenic composite having the lowest resistance (54) when said current limiting arc is initiated forms said ends.

11. With regard to Claim 7, Mitsubishi Electric Company in view of Otto et al. discloses the fusible element of Claim 6. Otto et al. further discloses that at least two of the plurality of current limiting fusible modules comprising composites 52 & 54 are secured serially one to another according to a desired power nominal and fault voltage.

12. Claims 8, 13-15, 23 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Electric Company (JP S64-039230), in view of Otto et al. (US 6762673) and further in view of Ries et al. (US 5986536).

13. With regard to Claim 8, Mitsubishi Electric Company in view of Otto et al. teaches the fusible element of Claim 6.

Mitsubishi Electric Company in view of Otto et al. does not teach that at least two current limiting fusible modules are secured in parallel in accordance with a desired power network nominal and fault current.

Ries et al., in Figure 4, teaches a resistive current-limiting device using superconductive materials. The device comprises a layer of superconductor material (4). With contact leads (7 & 8) made of silver, placed adjacent to either end of the superconductive layer (4). Ries et al. further teaches that at least two fusible modules are secured parallel to each to each other in accordance with a desired power network nominal and fault current (column 5 lines 31-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Mitsubishi Electric Company in view of Otto et al. with Ries et al., by placing the fusible elements of Mitsubishi Electric Company in view of Otto et al. in parallel as taught by Ries et al., for the purpose of allowing the devices to be used in systems with higher rated currents as taught by Reis in column 5 lines 36-38.

14. With regard to Claim 13, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. teaches a cryogenic fuse adapted to initiate a current limiting arc. As discussed above, Mitsubishi Electric Company in view of Otto et al. teaches a cryogenic fuse wherein the cryogenic fuse comprises: a plurality of a first

cryogenic composite; a plurality of a second cryogenic composite, each of said plurality of said second cryogenic composite being adjacent to one of said plurality of said first cryogenic composite to thereby create a plurality of current limiting fusible modules; and wherein at least one of said first and said second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc.

Otto et al. further discloses that a current limiter comprising an integrated cooling means for holding the composite at the operating temperature (column 3 lines 3-6).

Ries et al., in Figure 4, further teaches that a cryogenic fuse comprises a casing (20); that encloses a first cryogenic composite (7 & 8); a second cryogenic composite (4), the second cryogenic composite (4) being adjacent the first cryogenic composite (7 & 8), and that a plurality of these devices can be stacked in series for higher voltages (column 5 lines 32-36); a cooling means within said casing (column5 lines 43-46), the cooling means surrounding the first and second composites; contains an arc-extinguishing medium (11) made of quartz glass (column 5 lines 17 & 18) , within the casing; and wherein at least one of said first and said second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc.

15. With regard to Claim 14 & 15, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. discloses the cryogenic fuse of Claim 13. Reis et al. further discloses that the cooling means of Claim 13 comprises a coolant liquid that is liquid nitrogen (column 5 lines 43-46).

16. With regard to Claim 23, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. discloses a method for manufacturing a cryogenic fuse. Mitsubishi Electric Company teaches creating a current limiting fusible module. Otto et al. teaches creating a plurality of these devices. Each one of the plurality of current limiting fusible modules being adapted to initiate a current limiting arc, said current limiting fusible module comprising a first cryogenic composite (10) and a second cryogenic composite (11) adjacent to said first cryogenic composite, wherein at least one of said first and said second cryogenic composites has a non-linear and substantially increasing resistivity with respect to increasing at least one of temperature and current, further wherein one of said first and second cryogenic composites having the highest resistance will depart from its solid state thereby initiating said current limiting arc. Reis et al. teaches creating at least one fusible assembly by placing at least one of said plurality of current limiting fusible modules serially according to a desired power network nominal voltage (column 5 lines 33-36). Otto et al. also teaches placing a plurality of current limiting fuses in series, as seen in Otto et al. Figure 1C. Reis et al. further teaches creating a fusible element by assembling said at least one

fusible assembly of said at least one fusible assembly in parallel according to a desired power network nominal current (column 5 lines 36-38); and incorporating said fusible element in a casing comprising an arc-extinguishing medium and means for cryogenic cooling thereby creating said cryogenic fuse.

17. With regard to Claim 27, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. discloses the method of Claim 23. Otto et al. and Reis et al. further discloses that the creation of current limiting fusible modules, are performed using a layer manufacturing technique (Otto et al., column 4 lines 52-67 & column 5 lines 1-54 and Reis et al. column 3 lines 16-27).

18. Claims 16 & 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Electric Company (JP S64-039230), in view of Otto et al. (US 6762673) and further in view of Ries et al. (US 5986536) and McDougall et al. (US6043731).

19. With regard to Claim 16 & 24, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. teaches the cryogenic fuse as claimed in claim 13 & 23.

Reis et al. further teaches that the casing of Claim 13 is a cryostatic vessel. A cryostatic vessel is defined as an apparatus for maintaining a constant low temperature especially below 0°C. A cryostat therefore would inherently comprise cryogenic insulation material in order to maintain the constant temperature.

Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. does not teach that the cooling means comprises a cryocooler thermally connected to said plurality of a first cryogenic composite and a plurality of a second cryogenic composite,

McDougal et al., teaches the use of a cryocooler for cooling a medium surrounding the superconductor (column 3 lines 1-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. with McDougal et al., by using a cryocooler to cool the superconductor instead of the refrigeration machine (21) taught by Reis et al., for the purpose of cooling the cryogenic fuse in a more efficient and cost effective way.

20. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsubishi Electric Company (JP S64-039230), in view of Otto et al. (US 6762673) and further in view of Ries et al. (US 5986536) and Rapeaux et al. (US 5,153,803).

21. With regard to Claim 17, Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. teaches the cryogenic fuse as claimed in Claim 13.

Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. does not teach that a cooling means comprises at least one Peltier module thermally connected to the plurality of first and second composites.

Rapeaux et al., in Figure 4, teaches the use of a Peltier module to control the temperature of the superconductor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al. with Rapeaux, by using the Peltier module to cool the fuse taught by Mitsubishi Electric Company in view of Otto et al. and further in view of Reis et al., for the purpose of providing a method of cooling the superconductor in a cheap and simple manner.

Allowable Subject Matter

22. Claims 2, 4, 9-12,18-22, 25, 26, 28 & 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

23. Claims 2, 9, 18, 25 & 28 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims because the related prior art does not teach or fairly suggest securing a heat dissipater to both the first and the second cryogenic composites.

Otto et al., in figure 1b, discloses a thermally stabilizing element (58). However, this thermal stabilizer is secured to a bonding agent, and not secured to both the first and second composite.

24. As the prior art does not suggest the use of a thermal dissipater secured to both the first and second cryogenic composites, the examiner suggests adding this limitation to all base claims so as to make them allowable.

25. Claims 4, 10-12, 19-22, 26 & 29 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims because they depend on claims that would also be allowable if written to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Bauer whose telephone number is 571-272-5986. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAB

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PRIMARY EXAMINER